Treatability Test for Enhanced In Situ Anaerobic Dechlorination

A Partnership between US AFRL/MLQ, NFESC, US EPA NRMRL, and Industry

PURPOSE

The Air Force is responsible for remediating approximately 630 sites contaminated with chlorinated solvents such as PCE and TCE. The Navy, Army, and private industry have similar problems. A recent study revealed that up to 85 percent of Superfund sites contain chlorinated solvent-contaminated groundwater.

While pump-and-treat has been used for containment, no inexpensive, effective technologies exist which completely remove or destroy chlorinated solvents in groundwater. To fill this technology need, a protocol for implementing enhanced in situ anaerobic dechlorination has been developed and will be validated at five DOD contamination sites.

DESCRIPTION

In situ anaerobic dechlorination involves adding nontoxic electron donor substrates to enhance degradation of chlorinated contaminants by indigenous bacteria. A protocol will be drafted to provide guidance on how to conduct treatability tests of enhanced anaerobic dechlorination.

Protocol Components:

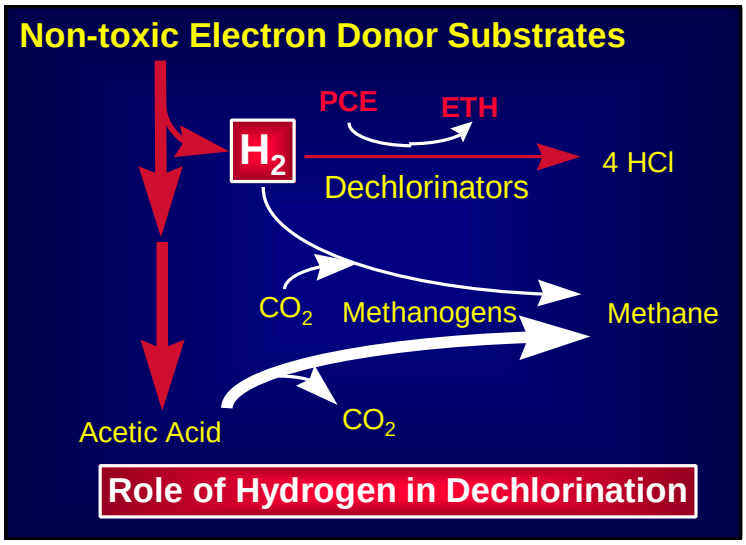
- ✓ Hydrogeological and geochemical site characterization
- ✓ Microcosm studies
- ✓ Field treatability tests
- ✓ Test monitoring
- ✓ Data interpretation

The protocol was written jointly by key professionals in microbiology, microbial ecology, biochemistry, hydrogeology, geochemistry, and field-scale engineering implementation. The protocol was peer-reviewed by a larger group of experts in those areas.

Desired Site parameters :

- ✓ Interest of facility to host the field test
- ✓ Good relationship with regulators
- ✓ Minimum PCE/TCE conc. of ~1 ppm
- ✓ Reasonable depth to groundwater (e.g. 10'-40')
- ✓ Minimal surface structures
- ✓ Adequate hydraulic conductivities

The protocol will be implemented at five DOD sites. The first site is at Cape Canaveral Air Station, FL. Field work will begin there in Spring 1999. When all five field tests are complete, the expert panel will review performance data and make recommendations for changes to the protocol. The authors will edit the protocol to incorporate recommendations. The final document will contain cost information on conducting the treatability tests, and detailed technical information generated from the five demonstrations.



BENEFITS

Development of a validated treatability test for enhanced anaerobic dechlorination will facilitate its rapid transition from research to full-scale implementation. The majority of treatment and containment processes for contaminated groundwater involve pump-and-treat approaches costing approximately $0.25 per 1,000 gallons of water treated, plus the costs of well installation and construction of above-ground treatment systems. Enhanced anaerobic dechlorination offers a cost-effective, active approach for destroying chlorinated solvent contaminants. The "unvalidated" draft protocol can be obtained by contacting Lt Lisa Ackert or Erica Becvar. The final version will be released in the summer of 2001 upon completion of the field testing.

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